

Bellwork: 5/7/13

Express using rational exponents:

1)  $\sqrt[4]{5x^2y^3z} = 5^{\frac{1}{4}}x^{\frac{1}{2}}y^{\frac{3}{4}}z^{\frac{1}{4}}$

Express in radical form:

2)  $x^{1/2}y^{3/4} = \sqrt[4]{x^2y^3}$

Evaluate:

3)  $-(64)^{2/3}$

$-16$

4)  $27^{4/3}$

$81$

11)  $(3x)^{\frac{2}{7}}y^{\frac{5}{7}} \sqrt[7]{9x^2y^5}$

12)  $13^{\frac{1}{4}}x^{\frac{3}{4}} \sqrt[4]{13x^3}$

8)  $7^{\frac{2}{3}}$

$\sqrt[3]{7^2}$

$\sqrt[3]{49}$

$$\text{If } b^x = b^y, \text{ then } x = y.$$

bases must be the same.

### Solving Exponential Equations

Examples:

1.  $2^{2x+1} = 2^{3x-2}$

$$\begin{array}{r} 2x+1 = 3x-2 \\ -2x+2 \quad -2x+2 \\ \hline 3 = x \end{array}$$

2.  $10^{3x+5} = 10^{x-3}$

$$\begin{array}{r} 3x+5 = x-3 \\ -x-5 \quad -x-5 \\ \hline 2x = -8 \\ x = -4 \end{array}$$

Practice:

1.  $2^5 = 2^{2x-1}$

$$\begin{array}{r} 5 = 2x-1 \\ +1 \quad +1 \\ \hline 6 = 2x \\ x = 3 \end{array}$$

2.  $5^x = 5^{3x+4}$

if bases are not the same, use exponents to make them the same. \*must go to smaller base

$$\text{If } b^x = b^y, \text{ then } x = y.$$

3.  $2^{5x-6} = 4^{x+6}$

$$\begin{array}{r} 2^{5x-6} = 2^{2(x+6)} \\ 5x-6 = 2x+12 \\ -2x+6 \quad -2x+6 \\ \hline 3x = 18 \\ x = 6 \end{array}$$

3.  $3^x = 9^{x+1}$

$$\begin{array}{r} 3^x = 3^{2(x+1)} \\ x = 2x+2 \\ -2x \quad -2x \\ \hline -x = 2 \\ x = -2 \end{array}$$

4.  $9^{x+1} = 27^{x-1}$

$$\begin{array}{r} 3^{2(x+1)} = 3^{3(x-1)} \\ 2x+2 = 3x-3 \\ -2x+3 \quad -2x+3 \\ \hline 5 = x \end{array}$$

4.  $4^{2x-1} = 8^{x+5}$

$$\begin{array}{r} 2^{2(2x-1)} = 2^{3(x+5)} \\ 4x-2 = 3x+15 \\ -3x+2 \quad -3x+2 \\ \hline x = 17 \end{array}$$

Solve for  $x$ .

1.)  $5^{4x-1} = 5^{x-2}$

2.)  $7^{4x-3} = 7^{2x+1}$

3.)  $8^{x-4} = 8^{5x+8}$

4.)  $10^{4x-5} = 10^{x+4}$

5.)  $9^x = 3^{x+1}$

6.)  $2^{x-1} = 4^x$

7.)  $8^{x+2} = 16^x$

8.)  $9^{3x} = 81^{x-4}$

9.)  $16^{2-x} = 32^{2x}$

10.)  $27^{2x-3} = 81^{4-x}$

11.)  $25^{3-x} = 125^{2x-1}$

12.)  $8^{4x-7} = 64^{x-3}$

Algebra 2 5.0  
Solving Exponential Equations #2

Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Pd

Solve for x.

1.)  $3^x = 3^{3x+1}$

2.)  $5^{3x+4} = 5^x$

3.)  $3^x = 9^{x+1}$

4.)  $2^5 = 2^{2x-1}$

5.)  $8^{x-1} = 16^{3x}$

6.)  $9^{3x} = 27^{x+2}$

7.)  $25^{2x} = 125^{x-3}$

8.)  $2^{2x-1} = 8^{x+7}$

9.)  $2^{x+1} = 32$

$$\begin{aligned} 2^{x+1} &= 2^5 \\ x+1 &= 5 \\ \boxed{x=4} \end{aligned}$$

10.)  $4^{x-1} = 8^x$

11.)  $7^{2x-1} = 49^{x-3}$

12.)  $100^{2x} = 10^{3x+2}$

$$\begin{aligned} 7^{2x-1} &= 7^{2(x-3)} \\ 2x-1 &= 2x-6 \\ -2x & \quad -2x \\ -1 &= -6 \quad \boxed{\text{no solution}} \end{aligned}$$

13.)  $64^{x-1} = 4$

14.)  $8^{2x+3} = 64^{x-5}$

15.)  $25^{3-x} = 5^{2x+1}$

$$\begin{aligned} 4^{3(x-1)} &= 4^1 \\ 3x-3 &= 1 \\ +3 & \quad +3 \\ \hline 3x &= 4 \\ \boxed{x=\frac{4}{3}} \end{aligned}$$

Homework:

pages 6 and 7 → evens!!

